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ABSTRACT

The educational accountability movement is changing the teacher's role in curriculum development from that of autonomous decision maker to agent of public school policy makers. To assess teacher reactions to factors influencing their autonomy, 75 teachers were exposed to pressures to change the content of fourth grade mathematics instruction in a hypothetical school. Teachers were receptive to change whether the pressure came from parents, other teachers, the building principal, published instructional objectives, textbooks, or test results. Furthermore, teachers did not consider new topics as necessarily supplanting the old. Tests have an influence on curriculum because they can be viewed as concrete statements of the public's curriculum expectations. As such, tests should be contructed so that items are written for each of list of predefined objectives. Standardized achievement tests hold students accountable for only a fraction of objectives. The promise testing holds as a mechanism for affecting curriculum depends on communicating test content. A taxonomy has been constructed to identify content differences among standardized achievement tests. As a test selection tool, it should provide an index of the relationship between test and instructional content. A sample page from the taxonomy is appended. (CP)

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RELATIONSHIPS BETWEEN TESTING AND THE CURRICULUM

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Relationships Between Testing and the Curriculum[1]

Andrew C. Porter[2]

Who controls the school curriculum and how? Certainly teachers and school administrators have a professional obligation to influence schooling in positive ways. Parents are concerned, too, as evidenced by the existence of PTA and other parent groups. Parents, as well as the larger community of taxpayers and the future employers of today's youth have a stake in public schooling. How can these diverse publics exercise more effectively their interests in schooling? What mechanisms exist or must be developed to facilitate clear communication about the content of instruction amongst the various stakeholders as well as between the stakeholders and what takes place in the classroom?

The accountability movement and minimal competency testing are activities developed in response to the public demand for knowledge and control of the content of instruction. It is dangerous, however, to limit our thinking about the factors influencing content decisions to just accountability and competency-based testing. To identify how choice of content is influenced, one must consider not only regulation and enforcement of content through administrative controls, but also efforts to persuade teachers to voluntarily adopt certain content.

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1 Paper presented at the 82nd Annual National PTA Convention, Atlanta, Georgia, June 11-14.

2 Andrew C. Porter, professor of educational psychology, is a senior researcher with the Institute for Research on Teaching who coordinates a research project on the external factors affecting teachers and teaching.

These efforts represent influences less tangible than administrative control, such as the local reading expert, the persuasive parent, and the teacher's training program. In this case the choice of curriculum content can be seen as a problem in knowledge dissemination, that is, a process of changing the teacher's knowledge and valuation of a particular subject matter in such a way that the converted teacher will be inspired to teach the content in question. Here, content of instruction is largely the teacher's decision.

In contrast, the accountability movements of the 1970s regard teachers not as autonomous decision makers but as agents of the public school policy makers. Curriculum decisions from this perspective are a subset of school governance decisions -- authoritative decisions made by school officials and carried out in accordance with officially prescribed procedures (see Van Geel, 1976).

The question of teacher autonomy and the control of content taught is being explored in research conducted by the Institute for Research on Teaching at Michigan State University.[3] Specifically, our research concerns two areas: (1) the external controls of teacher decisions about content and the influence of such controls, and (2) the content decision making that occurs outside the classroom.

Our research on the content of instruction is based on several beliefs. First, there is the obvious notion that there are certain subjects which most students learn only if taught. Students who

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3 The research referred to in this paper is work being conducted by William Schmidt, Robert Floden, Donald Freeman, John Schwille, and the author, members of an IRT research group concerned with the external factors affecting teachers' decisions.

study science extensively in secondary schools, for example, are far more knowledgeable about science than those who do not (Comber & Keeves, 1973). But even within a subject matter area and grade level, students differ in the content to which they are exposed. Recent trends toward individualization of instruction (in the sense of different objectives for different children), out-of-grade level testing, and the criticism of norm-referenced tests all signify a recognition of important differences in instructional content directed at students, even within the same classroom.

We also believe that educators -- practitioners and researchers alike -- have not given sufficient attention to the content of instruction and its potential for explaining achievement. For example, teacher education has given far more attention to delivery skills and classroom management skills than to methods for selecting the content of instruction appropriate for a particular student. This imbalance, we fear, may create teachers who are more interested in how something should be taught than in what should be taught.

Influences on Curriculum: Testing and Other Factors

Testing is one of the key ingredients in present day accountability programs for public schools. Tests can be used for diagnosis and prescription for individual children, but they can also be viewed as a concrete statement of the content that is expected to be taught in the classroom. This seems true for traditional standardized tests that are administered each spring (with results published in the local newspaper) and for the more recent tests of minimum competencies.

When viewing tests as a public statement of expectations for schooling, it is important to distinguish between two methods for develop-

ing tests. In one method, the desired content of schooling is carefully defined, usually by lists of objectives. Next, objectives are sampled and test items of the total set of objectives are written. Thus, students (and teachers) are held accountable on only a fraction of what they are expected to learn. This is the typical pattern for the widely used standardized achievement tests.

A second method of test construction starts at the same point as the first -- with a list of desired objectives. Rather than writing test items on only a fraction of the objectives, however, items are written for each objective. This second approach more closely corresponds to how I believe minimum competency tests should be constructed.

Those who wish to have an impact on the content of schooling are probably best served by the second type of test construction, writing a test item for each specified objective. This method serves as a concrete and understandable description of at least part of what teachers are expected to teach. The question remains as to how effective such a mechanism can be in facilitating public debate about what should be taught and communicating the results of such debate to teachers. If tests are to serve this communication purpose, teachers will be expected to teach to the test, not in the sense of item by item but in the sense of the implied curriculum.

The promise testing holds as a mechanism for affecting the school curriculum, however, is dependent on efficient methods for communicating to all concerned just exactly what the test includes. We have developed a taxonomy or classification system designed to provide uniform and useful descriptions of content covered by tests of mathematics (Porter, Schmidt, Floden, & Freeman, 1978). Development of the taxonomy began with an analysis of

individual items on existing standardized achievement tests. The analysis resulted in a classification scheme which has three dimensions: (1) mode of presentation (how questions are asked); (2) nature of material (the type of numbers or mathematical terms used); and (3) operation (the cognitive process which is required). The intersection of these three dimensions results in 468 categories; each category represents a topic that a teacher may elect to teach or not to teach. Thus, the taxonomy may be used to identify differences in content covered in different test series and should provide adequate indices of the relationship between test content and the content of instruction provided by classroom teachers.

To date, the taxonomy has been used to classify the content of four standardized tests of fourth-grade mathematics: the Stanford Achievement Tests, Iowa Tests of Basic Skills, Comprehensive Tests of Basic Skills, and the Metropolitan Achievement Tests. Analysis of those classification results reveals that the four tests have striking similarities and differences in content. For example, all four tests include only one item concerning division with remainders, despite the fact that fourth-grade textbooks include numerous exercises of this important skill. A striking difference is that the Iowa Tests of Basic Skills contain almost twice as many story problems as the Comprehensive Tests of Basic Skills. Such differences suggest that the "implied curricula" of standardized tests of fourth-grade mathematics vary considerably. The taxonomy provides a means of identifying the curriculum which a test covers for those responsible for selecting a test from the ones currently available.

The figure appended to this paper presents the scheme for describing content. The entries represent numbers of items on the fourth-grade test of mathematics within the Michigan Educational Assessment Program. Interestingly, the test was constructed to have exactly five items per objective. We have found that the test description communicates to teachers, making them aware of things they had not realized before. For example, a fourth-grade mathematics teacher working with our research team who had given the test described in the figure to her students over several years and was shocked to learn from our analysis that a third of the test involved simple questions about ordering.

Tests represent but one of many mechanisms for communicating the desired content of instruction. Textbooks may also be an effective way for various stakeholders to exercise their interest in what is taught. For example, nearly half the states mandate statewide adoption of textbooks, with Florida and Texas dominating the market. At present, however, many stakeholders of education are excluded from the process of selecting instructional materials. Only 22% of the nation's school districts provide for teacher participation on textbook selection committees, for example, and only recently did parents in Maryland win the right to see books and films before they are purchased (Bowler, 1978).

Teachers' Responses to Influencing Factors

What are teacher reactions to different factors which to a lesser or greater degree control what they teach? We recently completed a study of teachers' sensitivity to six different kinds of pressures to change the content of fourth-grade mathematics instruction (Floden, 1978). The pressures came from parents, other teachers in the school, the

building principal, published instructional objectives, textbooks supplied to the teacher, and test results reported in the local newspaper.

In the study, 75 participating teachers were recruited from six Michigan metropolitan areas -- Detroit, Saginaw, Benton Harbor, Grand Rapids, Battle Creek, and Birmingham. The six pressures were presented to the teachers in descriptions of hypothetical schools to which they were to imagine they had just been transferred. In each case, the pressure described called for the addition of five new topics, and provided no support for the teaching of five topics that the teacher had ordinarily covered. The teachers responded to questions about adding or deleting topics on a 7-point scale from "virtually certain to teach these topics" down to "virtually certain not to teach these topics."

The most striking aspect of the teachers' responses was their reported willingness to change their instructional content, whatever the source of pressure for change. The average response across all teachers and all situations having one or more pressures was 1.6 on the scale, where a score of 1.0 indicated "virtually certain to teach those topics." Even for those hypothetical situations that contained only a single pressure (e.g., new topics on a test), the average response was "fairly certain to teach those topics."

Regarding the question about continuing to teach the old topics, the results indicated that teachers do not seem to consider the "new" topics as necessarily supplanting the "old" ones. On the average, teachers were more than "fairly certain" to add five new topics, yet they still indicated they would continue to teach all that they had been teaching before. (This is an important finding in view of the

concern about what happens to the hard-to-test topics, such as affective behaviors.

Concluding Remarks

Using tests as a means of opening up for public debate the content of schooling is, of course, just one aspect of the testing controversy. Underlying the entire testing controversy is the concern for test bias. I will end my remarks with a brief comment on test bias.

Tests were originally developed as a means for giving people of equal merit equal access to life's opportunities. In my opinion, tests have helped to move our society toward that goal. We have now come full cycle, however, and tests are held to be biased against certain segments of our society.

The question of how biased are aptitude and achievement tests is a difficult one and remains largely unanswered. This is true in part because it has been difficult to agree upon a precise definition of bias. While the data on extent of bias are unclear, there is one finding that seems unequivocal; teacher perceptions of student achievement and achievement test scores are in surprisingly high agreement. If tests are indeed biased, then we have a larger problem, since teachers and tests agree. Clearly, a problem of test bias cannot be resolved by simply doing away with tests because teacher perceptions would remain. If there is bias, we must develop other, less biased mechanisms for assessing student achievement.

As a footnote to this, consider the results of a recent study which looked for the effects of giving teachers test score information on their students (Kellaghan, 1977). For the few children where test scores and

teachers' perceptions were not in agreement, teachers were much more inclined to change their perceptions when test scores were positive than when test scores were negative. It appears that teachers' perceptions can be modified, at least in a positive direction.

In summary, teachers (at least those in the elementary school) appear receptive to a variety of methods for communicating parents' desires to change the content of what is taught to their children. Tests are one such method and as such, hold promise as a mechanism through which control of the school curriculum can be shared among concerned groups. To be useful mechanisms for the control of content, however, tests must be available for public scrutiny and open to recommendations for change.

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Figure. Content Classification of MEAP

By _____ Date _____

MODE OF PRESENTATION

Nature of the material	Type of Operation	Graphs, Figures, Tables, or Physical Objects												Operations Specified												Operations not Specified (Story)											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Whole Numbers	single digit		1			5					15	5		5										5	10	2	3									2	
	single digit and multiple digit		4								5	5			5																						
	multiple digit										10				5									10														
Fractions	single																																				
	multiple																																				
Decimals																								2													
Percentages																																					
Alternative Number Systems																																					
Place Value											5													5													
Sentences	Number										5																										
	Algebraic																																				
Essential Units of Measurement		3										2												1	2												
Geometric Figures											8		5																								
Other											2	15																									

Operations:

1. Add
2. Subtract without borrowing
3. Subtract with borrowing
4. Add or subtract fractions without common denominator
5. Multiply
6. Divide without remainder
7. Divide with remainder
8. Combinations
9. Grouping
10. Identify equivalents
11. Identify rule (order)
12. Identify terms